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Cost Benefit Analysis of Farm Ponds in Sangli District

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Abstract

Water is rapidly becoming a scarce resource in almost all countries and cities with growing population on the one hand, and fast-growing economies, commercial and developmental activities on the other. This scarcity makes water both a social and an economic good. Its users range from poor households with basic needs to agriculturists, farmers, industries and from commercial undertakings with their needs for economic activity to rich households for their higher standard of living. For all these uses, the water supply projects (WSPs) and water resources development programs are being proposed for extension and augmentation; likewise with the rehabilitation of water supply for which measures for subsequent sustainability are being adopted. It is, therefore, essential to carry out a Cost- Benefit Analysis of projects so that planners, policy makers, water enterprises and consumers are aware of the actual economic cost of scarce water resources, and the appropriate levels of tariff and cost recovery needed to financially sustain it.

Keywords: Farm Ponds, Cost-Benefit Analysis, Agricultural Productivity, Irrigation Management, Water Resource Management, Crop Productivity, Benefit-Cost Ratio, Rural Development, Livelihood Improvement, Sangli District.

Introduction:

The first Prime Minister, Jawaharlal Nehru said "Everything else can wait, but not agriculture." There have been several policy statements made for agriculture since last sixty years. Indian Agriculture depends on large extent, upon rainfall the cycle of which in the country is such that further increases the need for adequate Irrigation.

To overcome the problem of irregular rain fall and management of water in drought period The state Government of Maharashtra has introduced various programs for drought prone areas such as, Employment Guaranty program, Drought prone area program, Soil and water conservation program, program of construction of tanks, Farm Ponds and deepening of wells for irrigation purpose.

The Government of Maharashtra has introduced the scheme of construction of Farm Pond under 'Rashtriya Krushi Vikas Yojana' according to Government Regulation dated 1st July, 2010 and 'Magel Tyala Shetatale (MTS)' Government Regulation Dated 17th February, 2016 and National Horticulture Management Scheme for Community Farm Ponds.

A farm pond is a large hole dug out in the earth, usually square or rectangular in shape, which harvests rainwater and stores it for future use. It has an inlet to regulate inflow and an outlet to discharge excess water. Water from the farm pond is conveyed to the fields manually, by pumping, or by both methods. Farm pond size ranges 15×15×3 meter, 20×20×3 meter, 25×25×3 meter and 30×30×3 meter, respectively, according to size of land holding of a farmer. Government provides subsidy for construction of farm pond according to their size. Maximum Rs.50,000 subsidy provide for the size of 30×30×3.

Rational of the study:

Agriculture sector contribute large share in the countries national income though the share of agriculture sector was steadily declining. In India the farmers are facing so many problems. They are unknown about the pricing practices for agriculture produce. In India draught is also a major problem faced by farmers. Recently Government of Maharashtra has declared the reconstruction of crop loan to farmers on certain conditions to drought regions. Considering overall situation of agriculture sector and farmers the researcher has come across to the following significance of the Study

- 1) Whether the farm ponds increases the crop production.
- 2) Whether there are benefits of farm ponds.

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Objectives of the study:

1. To Analyze the cost of farm ponds.
2. To study benefits from farm ponds in sample area.
3. To perform cost benefit analysis of farm ponds sample area.

Hypotheses:

1. H01. There is significant impact of farm ponds on the crop productivity.
2. H02. There is significant relationship between cost of farm ponds and benefits from farm ponds

Research methodology:

I] DATA COLLECTION: The researcher has used primary and secondary sources for collection of data.

Table No: 1**Selection of Farm Pond Samples in the Sangli District**

Particulars	Miraj	KM	Tasgaon	Jat	Vita	K	Atpadi	Palus	Walva	Shirala	Total
Farm ponds	199	416	1181	767	186	46	34	14	13	12	2868
10% sampling	20	42	118	77	19	5	3	1	1	1	287

(Source: Department of Agriculture, Statistical office, Sangli)

Note: KM= Kavte-mahankal, K= Kadegaon

6. Data analysis and interpretation:**Social Group Wise Sources of Income of Sample Households in Sangli District:**

The table given below shows the social group wise sources of income before and after farm ponds in Sangli district. Social group include General, OBC and SC/ST and sources of income include cultivation, livestock, agriculture labour, and non agricultural income.

Table No. 2**Social Group Wise Sources of Income of Sample Households (in Rs.)**

Sr.	Source of Income	General	%	OBC	%	SC/ST	%
		Before Farm Pond					
1	Cultivation	188812	72.79	105081	64.83	93583	63.54
2	Livestock	54824	21.14	46419	28.64	35139	23.86
3	Agriculture Labour	3879	1.50	2337	1.44	4944	3.36
4	Non- agriculture Income	11879	4.58	8256	5.09	13611	9.24
5	Total	259394	100	162093	100	147277	100
		After Farm Pond					
1	Cultivation	395830	53.25	244244	41.53	172944	52.87
2	Livestock	295903	39.81	314581	53.48	151639	46.36
3	Agriculture Labour	24333	3.27	20047	3.41	1528	0.47
4	Non-agriculture Income	27273	3.67	9302	1.58	972	0.30
5	Total	743339	100	588174	100	327083	100
		Net Change					
1	Cultivation	207018	-19.54	139163	-23.30	79361	-10.67
2	Livestock	241079	18.67	268162	24.85	116500	22.50
3	Agriculture Labour	20454	1.78	17710	1.97	-3416	-2.89
4	Non-agriculture Income	15394	-0.91	1046	-3.51	-12639	-8.94
5	Total	483945	0.00	426081	0.00	179806	0.00

Source: Field Survey

The above table shows that before farm Pond out of general category respondents' income earned by cultivation Rs.188812, Rs 54824 by livestock, Rs 3879 by agricultural labour and Rs 11879 by non-agricultural incomes. The before farm Pond In case of OBC respondents Rs 105081 income earned by cultivation, Rs 46419 earned by livestock, Rs 2337 by agricultural labour and Rs 8256 by non-agricultural income. In case of SC/ST category respondents Rs 93583 income earned by cultivation,

The researcher collected primary data regarding cost and benefits of farm ponds to sample respondents through interview schedule and secondary data was collected from the Books, Journals, Magazines, Internet, Newspapers, Articles.

II] SAMPLE DESIGN: Sangli district consist of 10 talukas from each taluka 10% operative Farm ponds are selected at random sampling method. Moreover the total villages selected and 10% beneficiaries have been selected across the different social groups of the families covered under Farm Pond irrigation from each village. Total number of 287 households are selected and fieldwork was carried by using schedule method.

Rs 35139 by livestock, Rs 4944 by agriculture labour and Rs 13611 by non-agricultural income. From the above analysis it was observed that in case of general category respondent's income from cultivation, live stock, agriculture labour and non-agricultural income was increased. In case of OBC respondent's income from cultivation was decreased and income from live stock, agriculture labour and non-agricultural income was increased after farm pond. in case of SC/ST category respondents' income from cultivation and

live stock was increased and income from agriculture labour and non-agricultural income was decreased.

After farm Pond out of general category respondents' income earned by cultivation Rs. 395830, Rs 295903 by livestock, Rs. 24333 by agricultural labour and Rs 27273 by non-agricultural incomes. In the after farm pond OBC category respondents Rs 244244 income earned by cultivation, Rs 314581 earned by livestock, Rs 20047 by agricultural labour and Rs 9302 by non agricultural income. In case of SC/ST category respondents Rs 172944 income earned by cultivation, Rs 151639 by livestock, Rs 1528 by agriculture labour and Rs 972 by non agricultural income. Net change of general category respondents' income earned by cultivation is Rs. 207018, Rs 241079 by livestock, Rs. 20454 by

Table No. 3

Social Group Wise Expenditure Pattern of Sample Households in Sangli district

(In Rs)

Sr.	Expenditure Pattern	General	%	OBC	%	SC/ST	%
		Before Farm Pond					
1	Lobour	30888	23.35	24860	23.21	23833	28.67
2	seeds	27137	20.51	12350	19.17	13361	16.07
3	Fertilizers And Pesticides	41164	31.11	17500	32.19	22750	27.36
4	Charges for Equipments	24367	18.42	12400	18.98	16139	19.41
5	Electricity Charges	6505	4.92	6041	4.78	5194	6.25
6	Others	2239	1.69	2110	1.67	1861	2.24
7	Total	132300	100	75261	100	83138	100
After Farm Pond							
1	Lobour	50945	25.13	40650	27.28	36139	28.03
2	seeds	34630	17.08	27450	18.42	20056	15.56
3	Fertilizers and Pesticides	66285	32.70	42500	28.53	36333	28.18
4	Charges for Equipment	36948	18.23	24320	16.32	24972	19.37
5	Electricity Charges	10827	5.34	11558	7.76	9361	7.26
6	Others	3067	1.51	2512	1.69	2056	1.59
7	Total	202702	100	148990	100	128917	100
Net Change							
1	Lobour	20057	1.78	15790	4.07	12306	-0.64
2	seeds	7493	-3.43	15100	-0.75	6695	-0.51
3	Fertilizers and Pesticides	25121	1.59	25000	-3.66	13583	0.82
4	Charges for Equipment	12581	-0.19	11920	-2.66	8833	-0.04
5	Electricity Charges	4322	0.42	5517	2.98	4167	1.01
6	Others	828	-0.18	402	0.02	195	-0.65
7	Total	70402	0.00	73729	0.00	45779	0.00

Source: Field Survey

The above table shows that before farm Pond in case of General category farmers 23.35% expenses made on labour, 20.51% on seeds, 31.11% on fertilizers and pesticides, 18.42% on charges for equipment's, 4.92% on electricity and 1.69% on other expenses. In case of OBC category farmers 23.21% expenses made on labour, 19.17% on seeds, 32.19% on fertilizers and pesticides, 18.98% on charges for equipment, 4.78% on electricity and 1.67% on other expenses. In case of SC/ST category farmers 28.67% expenses made on labour, 16.07% on seeds, 27.36% on fertilizers and pesticides, 19.41% on charges for equipment, 6.25% on electricity charges and 2.24% other expenses.

After farm Pond in case of General category farmers 25.13% expenses made on labour, 17.08% on seeds, 32.70% on fertilizers and pesticides, 18.23% on

agricultural labour and Rs 15394 by non agricultural incomes. In case of OBC respondent's net change is Rs 139163 income earned by cultivation, Rs 268162 earned by livestock, Rs 17710 by agricultural labour and Rs 1046 by non agricultural income. In case of SC/ST category respondent's net change is Rs. 79361 income earned by cultivation, Rs 116500 by livestock, Rs -3416 by agriculture labour and Rs -12639 by non agricultural income.

Social Group Wise Expenditure Pattern of Sangli district:

Table given below shows the expenses incurred by General category, OBC category and SC/ST category farmers on labour, seeds, fertilizers and pesticides, charges for equipment's, electricity charges, and other expenses.

charges for equipment, 5.34% on electricity charges and 1.51% other expenses. In case of OBC category farmers 27.28% expenses made on labour, 18.42% on seeds, 28.53% on fertilizers and pesticides, 16.32% on charges for equipment, 7.76% on electricity charges and 1.69% other expenses. In case of SC/ST category farmers 28.03% expenses made on labour, 15.56% on seeds, 28.18% on fertilizers and equipment, 19.37% on charges for equipment, 7.26% on electricity charges and 1.59% made other expenses.

It was found that net change of General category farmers is Rs. 20057 on labour, Rs. 7493 expenses on seeds, Rs. 25121 on fertilizers and pesticides, Rs. 12581 on charges for equipment and Rs. 4322 on electricity charges and Rs. 828 on other expenses. Net change of OBC category farmers is Rs. 15790 on labour, Rs. 15100 expenses on seeds, Rs.

25000 on fertilizers and pesticides, Rs. 11920 on charges for equipment and Rs. 5517 on electricity charges and Rs. 402 on other expenses. Net change of SC/ST category farmers is Rs. 12306 on labour, Rs. 6695 expenses on seeds, Rs. 13583 on fertilizers and pesticides, Rs. 8833 on charges for equipment and Rs. 4167 on electricity charges and Rs. 195 on other expenses. It was found that social group wise expenditure was also increased after farm pond.

Social Group Wise Benefit-Cost Ratio of Sample Farmers in Sangli District:

Table No. 4

Social Group Wise Benefit-Cost Ratio of Sample Farmers in Sangli District (in Rs)

Sr.	Benefit-Cost Ratio	General	OBC	SC/ST	Overall
		Before Farm Pond			
1	Total Cost of Cultivation	132300	75261	83138	96900
2	Gross Return	188812	105081	93583	129159
3	Net Return	56512	29820	10445	32259
4	Benefit Cost Ratio	01: 1.4	01: 1.4	01: 1.1	01: 1.3
After Farm Pond					
1	Total Cost of Cultivation	202702	148990	128917	160203
2	Gross Return	395830	244244	172944	271006
3	Net Return	193128	95254	44027	110803
4	Benefit Cost Ratio	01: 2.0	01: 1.6	01: 1.3	01: 1.7

Source: Field Survey

Above table shows that benefit cost ratio on basis of social groups in Sangli district. In the General category farmers total cost of cultivation is Rs. 122300, gross returns is Rs. 188812, Net returns is Rs. 56512 & benefit cost ratio is 1:1.4 in the period of before farm pond and in the after farm pond it was increased in the total cost of cultivation is Rs. 202702, gross returns are Rs. 395830, Net returns is Rs. 193128 and benefit cost ratio is 1:2.0. In case of OBC category farmers total cost of cultivation is Rs. 75261, gross returns are Rs. 105081, Net returns is Rs. 29820 & benefit cost ratio is 1:1.4 in the period of before farm pond and in the after farm pond it was increased in the total cost of cultivation is Rs.148990, gross returns is Rs. 244244, Net returns Rs. 95254 and

The cost of production of any crop is the most important aspect of the farm economy. Cost studies in agriculture provide an important part of information and knowledge essential for the formulation and evaluation of economic policies both at micro and macro levels. Hence, data relating to cost and return of General category farmers, OBC category farmers and SC/ST category farmers producing four major crops, namely wheat, grapes, pomegranate and sugarcane take into consideration and analysed below.

benefit cost ratio is 1:1.6 In case of SC/ST category farmers total cost of cultivation is Rs. 83138, gross returns is Rs. 93583, Net returns is Rs. 10445 & benefit cost ratio is 1:1.1 in the period of before farm pond and in the after farm pond it was increased in the total cost of cultivation is Rs.128917, gross returns is Rs. 172944, Net returns Rs. 44027 and benefit cost ratio is 1:1.3.

Hypothesis testing:

Impact of farm ponds on Productivity

H0: There is no change in productivity before and after farm Pond.

H1: There is change in productivity before and after farm thank.

Table 5

Descriptive Statistics of Wilcoxon on Signed Ranks Z Test

Type of Crops	Before and after	Descriptive		Wilcoxon on Signed Ranks Test		Decision
		Mean	Std. Deviation	Z	P value	
Sugar Cane	Before	1.795	1.3032	-12.531	0	Reject H0
	After	2.772474	1.754248			
Turmeric	Before	0.32	0.592	-5.765	0	Reject H0
	After	0.53	0.765			
grapes	Before	0.46	0.899	-4.716	0	Reject H0
	After	0.77	1.171			
Pomegranates	Before	0.24	0.6799	-0.848	0.396	Accept H0
	After	0.19	0.515			
Banana	Before	0.13	0.462	-4.396	0	Reject H0
	After	0.31	0.797			

There is significant relationship in Cost and Benefits from Farm Ponds.

H0: Average income is equal for before and after farm Pond.

H1: There is increase in average income after farm Pond as compare before farm Pond.

Table No.6

Descriptive Statistics of Wilcoxon Signed Ranks Z Test

Type	Descriptive		Wilcoxon Signed Ranks Test		Decision
	Mean	Std. Deviation	Z	P value	
Before	284000	219010.7	-2.643	0.008	Reject H0

After	290000	217121.9			
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It is clear from the above table No.5 that there is increase in average income after farm Ponds. (i.e.) mean income is increased from 284000 to 290000 with P value – 0.008.

Conclusion:

Researcher has made data analysis as per Socio-economic and demographic features of 287 sample households according to the social group wise analysis and hypotheses testing. From the data analysis it was observed that expenses incurred by farmers increased after farm pond. The study found that sources of income after farm pond were increased. It was also found that after farm pond most of the farmers are taking commercial crops instead of food crops. The study observed that after farm pond irrigated land holding increased which increases the productivity of the farmers So it can be concluding that farm ponds in Sangli District have positive impact on the farmers

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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